

凹凸棒石载铜（银）抗菌剂的研制及性能研究

论文标题:凹凸棒石载铜（银）抗菌剂的研制及性能研究

Research of Cu-carrying (Ag-carrying) Attapulgite Inorganic Antibacterial Agent and the Properties

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inorganic antibacterial agent; Cu-carrying antibacterial agent; Ag-carrying antibacterial; attapulgite; ion absorption; antibacterial action

本文对以凹凸棒石粘土为载体的银、铜型无机抗菌剂的制备工艺及其性能进行了试验和研究。制备工艺试验研究表明:1、天然凹凸棒石粘土需经过提纯处理方可以作为抗菌剂 I 级载体。2、湿法酸活化法可增加凹凸棒石粘土的金属离子负载量,同时提高凹凸棒石的白度,使之成为优异的 II 级载体。3、抗菌金属离子加载的较佳合成工艺为:载铜时以<200m 目的凹凸棒石粘土与 0.15mol/L 的铜氨浸渍溶液 1:20 固液比在 90℃ 水浴中处理 6h,操作压力保持在 0.04~0.02Mpa 之间;载银时以<200m 目的凹凸棒石粘土与 0.03mol/L 的银氨浸渍溶液 1:20 固液比在 60℃ 下处理 5h,操作压力保持在 0.04~0.02Mpa 之间,同时注意避光操作。性能研究表明:1、凹凸棒石载铜(银)无机抗菌剂对大肠杆菌和金黄色葡萄球菌均具有很强的杀灭能力。2、载铜、载银抗菌剂在静水中具有优良的缓释性能。3、载铜抗菌剂粉体的耐光性比载银抗菌剂粉体的好,但载银抗菌剂分散在蒸馏水中并滴加氨水时 90 天内也未见明显变色。综合原子吸收分光光度计分析、XRD 分析和红外光谱分析,认为所合成的凹凸棒石载铜(银)抗菌剂中,铜、银是以离子形式存在的,而载体仍然保持原有的晶体结构,凹凸棒石特有的优异性能(胶体性、吸附性)也未有明显改变。

The researches about the Cu-carrying antibacterial agents and Ag-carrying antibacterial agents by using attapulgite as the carrier were done in this thesis. The results showed that: 1. To be used as the I carrier, crude attapulgite should be purified. 2. Being treated by HCl acid solution, the attapulgite was turned into the II carrier with higher absorbing ability, and could also be bleached. 3. The better process conditions for Cu-carrying was that the II carrier was dipping into the 0.15mol/L copper ions solution in a 90 °C water bath for 6 hours under the pressure of 0.04~0.02Mpa. The better process for Ag-carrying was that the II carrier was dipping into the 0.03mol/L silver ions solution in a 60°C water bath for 5 hours under the pressure of 0.04~0.02Mpa. Properties research showed: 1. The made inorganic antibacterial agents were efficacious for bacillus coli and staphylococcal bacteria. 2. In static water, the antibacterial agents could be slow-released well. 3. The Cu-carrying antibacterial agent powder had better light stability than Ag-carrying agent powder. XRD, infrared analysis and atomic absorption spectrophotometer results showed that, the copper and silver existed in the form of ions in the inorganic antibacterial agents, the carrier retained the original crystal structure of attapulgite, and other abilities were still remained.

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